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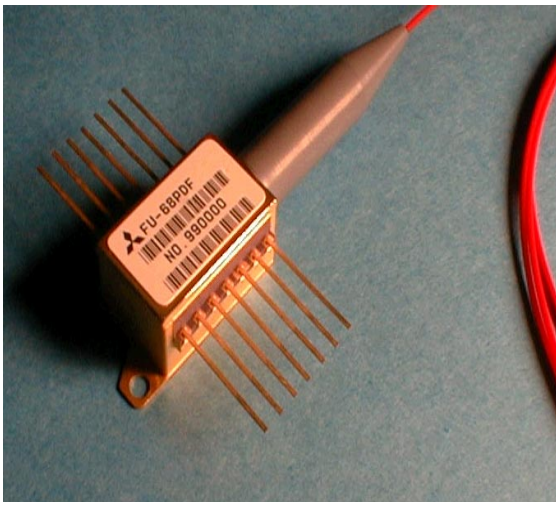
MITSUBISHI (OPTICAL DEVICES)

FU-68PDF-V520MxxB

1.55 μm DFB-LD MODULE WITH POLARIZATION MAINTAINING FIBER PIGTAIL (WAVELENGTH SELECTED, BIAS CIRCUIT INTEGRATED, DIGITAL APPLICATION)

DESCRIPTION

Module type FU-68PDF-V520MxxB is a 1.55μm DFB-LD module with polarization maintaining optical fiber.
This module is suitable to a CW light source for external modulator for use in 2.5Gb/s and 10Gb/s digital optical communication systems.
This module is prepared in accordance with ITU-T recommendation wavelength channel plan for Dense-WDM transmission.



FEATURES

- Multi quantum wells (MQW) DFB Laser Diode module
- Input impedance is 25Ω
- Emission wavelength is in 1.55μm band
- Polarization maintaining optical fiber pig-tail
- Built-in optical isolator
- Built-in thermal electric cooler
- Butterfly package
- With photodiode for optical output monitor

APPLICATION

High speed transmission systems (~10Gb/s)
Dense-WDM systems

ABSOLUTE MAXIMUM RATINGS (Tld=Tset)

Parameter		Symbol	Conditions	Rating	Unit
Laser diode	Optical output power	Pf	CW	24	mW
	Forward current	If	CW	150	mA
	Reverse voltage	Vrl	–	2	V
Photodiode	Reverse voltage	Vrd	–	20	V
	Forward current	Ifd	–	2	mA
Thermo-electric cooler (Note)	Cooler current	Ipe	–	1.3	A
	Cooler voltage	Vpe	–	3.1	V
Operating case temperature		Tc	–	-20 ~ 70	°C
Storage temperature		Tstg	–	-40 ~ 85	°C

Note) Even if the thermo-electric cooler (TEC) is operated within the rated conditions, uncontrolled current loading or operation without heatsink may easily damage the module by exceeding the storage temperature range. Thermistor resistance should be properly monitored by the feedback circuit during TEC operation to avoid the catastrophic damage.

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ELECTRICAL/OPTICAL CHARACTERISTICS (Tld=Tset, Tc=25°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
Threshold current	Ith	CW	-	10	25	mA
Operating current	Iop	CW, Pf=20mW	-	-	130	mA
Operating voltage	Vop	CW, Pf=20mW	-	-	2	V
Input impedance	Zin	Pf=20mW	-	25	-	Ω
Light-emission central wavelength	λc	CW, Pf=20mW	(Note 1)			nm
Central wavelength drift with case temp.	Δλc/ΔTc	Tc=-20~70°C	-1	-	0	pm/°C
Laser operating temperature	Tset	-	15	-	35	°C
Spectral line width	Δf	CW, Pf=20mW	-	-	20	MHz
Side mode suppression ratio	Sr	CW, Pf=20mW	33	40	-	dB
Cutoff frequency (-1.5dB optical)	fc	Pf=20mW	2	-	-	GHz
Polarization extinction ratio	Ex	CW, Pf=20mW	20	25	-	dB
Relative intensity noise	Nr	CW, Pf=20mW, 0.5~3GHz	-	-155	-145	dB/Hz
Tracking error (Note 2)	Er	Tc=-20~70°C, APC, ATC	-	-	0.5	dB
Differential efficiency	η	CW, Pf=20mW	0.15	-	-	mW/mA
Monitor current	Imon	CW, Pf=20mW, Vrd=5V	0.2	-	4	mA
Optical isolation	Iso	Tc=25°C	35	-	-	dB
		Tc=-20~70°C	23	-	-	
Dark current (PD)	Id	Vrd=5V, Tc=-20~70°C	-	-	0.1	μA
Capacitance (PD)	Ct	Vrd=5V, f=1MHz	-	-	10	pF

Note 1) See Table 1.

Note 2) Er=max|10×log(Pf / Pf@25°C)|

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THERMAL CHARACTERISTICS (Tld=Tset, Tc=-20~70°C)

Parameter	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
Thermistor resistance	Rth	Tld=25℃	9.5	10	10.5	kΩ
B constant of Rth	B	-	-	3950	-	K
Cooling capacity	ΔT	Pf=20mW, Tc=70°C	55	-	-	°C
Cooler current	Ipe	Pf=20mW, Tc=65°C, Tld=Tset	-	0.7	1	A
		Pf=20mW, Tc=70°C, Tld=Tset	-	0.9	1.2	A
Cooler voltage	Vpe	Pf=20mW, Tc=65°C, Tld=Tset	-	1.4	2.3	V
		Pf=20mW, Tc=70°C, Tld=Tset	-	2	2.6	V

FIBER PIGTAIL SPECIFICATIONS

Parameter	Limits	Unit
Type	PM (Note 3)	-
Mode field diameter	11±1	μm
Cladding diameter	125±3	μm
Secondary coating outer diameter	0.9±0.1	mm
Polarization axis	slow axis	-
Connector	FC/PC	-
Optical return loss of connector	40 (min)	dB

Note 3) PMF - Sumitomo Panda fiber (PM-155)

DOCUMENTATION (Tld=Tset)

- Fiber output power vs. Laser forward current at Tld=Tset and Tc=-20,25,70°C
- Threshold current (Ith)
- Laser forward current (Iop) at Pf=20mW
- Laser forward voltage (Vop) at Pf=20mW
- Laser operating temperature (Tset) at λc (Note 4)
- Monitor current (Imon) at Pf=20mW
- Thermistor resistance (Rth)
- Cooler current (Ipe) at Pf=20mW and Tc=70°C
- Cooler voltage (Vpe) at Pf=20mW and Tc=70°C

Note 4) Tset is attached as a reference data. Rth should be used in order to tune the wavelength to the specified value accurately.

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Table 1.

Type number	λc (nm)	Type number	λc (nm)	Type number	λc (nm)
FU-68PDF-520M9B	1529.55	FU-68PDF-520M39B	1541.35	FU-68PDF-520M69B	1553.33
FU-68PDF-520M10B	1529.94	FU-68PDF-520M40B	1541.75	FU-68PDF-520M70B	1553.73
FU-68PDF-520M11B	1530.33	FU-68PDF-520M41B	1542.14	FU-68PDF-520M71B	1554.13
FU-68PDF-520M12B	1530.72	FU-68PDF-520M42B	1542.54	FU-68PDF-520M72B	1554.54
FU-68PDF-520M13B	1531.12	FU-68PDF-520M43B	1542.94	FU-68PDF-520M73B	1554.94
FU-68PDF-520M14B	1531.51	FU-68PDF-520M44B	1543.33	FU-68PDF-520M74B	1555.34
FU-68PDF-520M15B	1531.90	FU-68PDF-520M45B	1543.73	FU-68PDF-520M75B	1555.75
FU-68PDF-520M16B	1532.29	FU-68PDF-520M46B	1544.13	FU-68PDF-520M76B	1556.15
FU-68PDF-520M17B	1532.68	FU-68PDF-520M47B	1544.53	FU-68PDF-520M77B	1556.55
FU-68PDF-520M18B	1533.07	FU-68PDF-520M48B	1544.92	FU-68PDF-520M78B	1556.96
FU-68PDF-520M19B	1533.47	FU-68PDF-520M49B	1545.32	FU-68PDF-520M79B	1557.36
FU-68PDF-520M20B	1533.86	FU-68PDF-520M50B	1545.72	FU-68PDF-520M80B	1557.77
FU-68PDF-520M21B	1534.25	FU-68PDF-520M51B	1546.12	FU-68PDF-520M81B	1558.17
FU-68PDF-520M22B	1534.64	FU-68PDF-520M52B	1546.52	FU-68PDF-520M82B	1558.58
FU-68PDF-520M23B	1535.04	FU-68PDF-520M53B	1546.92	FU-68PDF-520M83B	1558.98
FU-68PDF-520M24B	1535.43	FU-68PDF-520M54B	1547.32	FU-68PDF-520M84B	1559.39
FU-68PDF-520M25B	1535.82	FU-68PDF-520M55B	1547.72	FU-68PDF-520M85B	1559.79
FU-68PDF-520M26B	1536.22	FU-68PDF-520M56B	1548.11	FU-68PDF-520M86B	1560.20
FU-68PDF-520M27B	1536.61	FU-68PDF-520M57B	1548.51	FU-68PDF-520M87B	1560.61
FU-68PDF-520M28B	1537.00	FU-68PDF-520M58B	1548.91	FU-68PDF-520M88B	1561.01
FU-68PDF-520M29B	1537.40	FU-68PDF-520M59B	1549.32	FU-68PDF-520M89B	1561.42
FU-68PDF-520M30B	1537.79	FU-68PDF-520M60B	1549.72	FU-68PDF-520M90B	1561.83
FU-68PDF-520M31B	1538.19	FU-68PDF-520M61B	1550.12	FU-68PDF-520M91B	1562.23
FU-68PDF-520M32B	1538.58	FU-68PDF-520M62B	1550.52	FU-68PDF-520M92B	1562.64
FU-68PDF-520M33B	1538.98	FU-68PDF-520M63B	1550.92	FU-68PDF-520M93B	1563.05
FU-68PDF-520M34B	1539.37	FU-68PDF-520M64B	1551.32	FU-68PDF-520M94B	1563.45
FU-68PDF-520M35B	1539.77	FU-68PDF-520M65B	1551.72	FU-68PDF-520M95B	1563.86
FU-68PDF-520M36B	1540.16	FU-68PDF-520M66B	1552.12	FU-68PDF-520M96B	1564.27
FU-68PDF-520M37B	1540.56	FU-68PDF-520M67B	1552.52	FU-68PDF-520M97B	1564.68
FU-68PDF-520M38B	1540.95	FU-68PDF-520M68B	1552.93		

All wavelengths are referred to vacuum.

Tolerance is λc ± 0.05nm.

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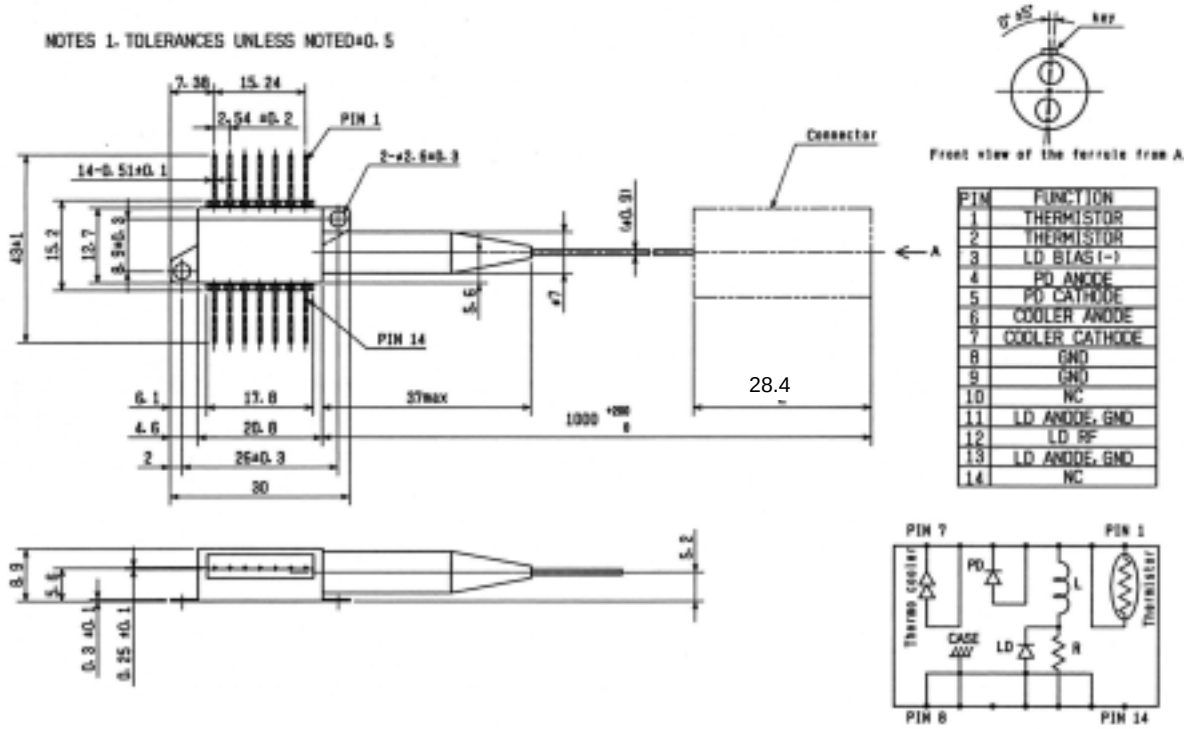
OUTLINE DIAGRAM

(Unit : mm)



PIN	FUNCTION
1	THERMISTOR
2	THERMISTOR
3	LD BIAS(-)
4	PD ANODE
5	PD CATHODE
6	COOLER ANODE
7	COOLER CATHODE
8	GND
9	GND
10	NC
11	LD ANODE, GND
12	LD RF
13	LD ANODE, GND
14	NC

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